

The Mechanics of Evolution

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Lecture Description: The links between the mechanics of biomolecules and their evolution will be discussed within simple physical models. Our main example will be the protein. Proteins are a matter of dual nature: As a physical object, a protein molecule is a folded chain of amino acids with multifarious biochemistry. But it is also an instantiation along an evolutionary trajectory determined by its function. Theories of proteins therefore need to examine both aspects, the biophysical and the evolutionary. Specifically, they need to explain how the DNA gene is mapped into the functional phenotype of the protein. We will review several physical approaches to the protein problem, focusing on a mechanical framework, which treats proteins as evolvable condensed matter.